

MISSOURI resources

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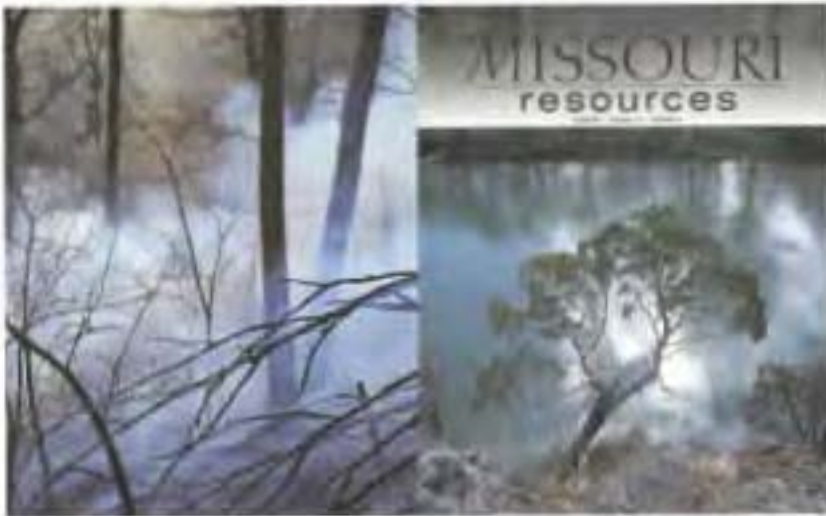
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©2002 photo by Scott Myers

Above right: Chinkapin oaks stand amid tall native grass at Meramec State Park.

Above: Double-pane glass is sealed at Target Windows, manufacturer of energy efficient Low-E/Argon windows.



Front Cover: A cedar tree clings to the edge of Butterfly Bluff in the Meramec Mosaic Natural Area.

Back Cover: A controlled burn clears underbrush and promotes the growth of native plants at Sam A. Baker State Park.

Cover photos by Scott Myers



Director's Comment

Most of you know from reading the papers and listening to the news that the State of Missouri struggled a great deal with balancing the fiscal year 2003 budget. Although we now do have a balanced budget, it has taken sacrifices on the part of state employees to both find the necessary dollars and to maintain the services we now provide to protect your natural resources.

One of our most highly profiled challenges of the last few months has been addressing lead contamination in Herculaneum. In April, the Missouri Department of Natural Resources, the Missouri Attorney General's Office and the Doe Run Company signed the final written settlement agreement that formalized an earlier agreement in principle reached in March.



The centerpiece of the agreement is the voluntary property purchase. The Doe Run Company has agreed to purchase 160 homes closest to the lead smelter in Herculaneum. Homes with children under 72 months of age will receive first priority. Offers to the remaining homes will be made through the end of December 2004 and will be prioritized based on risks to human health in consultation with the Missouri Department of Health and Senior Services.

The homes will remain vacant until demolished or until we're sure that reoccupancy of a residence is not a risk to human health. Studies and monitoring of the contamination will give us this information. We also wanted to ensure that homeowners receive a fair offer for their property. The Doe Run Company will be responsible for paying a \$1 million civil penalty for any non-compliance with the provisions in the agreement regarding the property purchase plan. The agreement also settles the order issued last September by the department, which focused primarily on hazardous waste, water and air pollution issues. (For more details, see the related news brief on page 14.)

This agreement is being completely funded by The Doe Run Company without state or federal money. Herculaneum is the only place in the country that is being cleaned up based on an agreement between the state and federal agencies. The agreement will not compromise the

actions currently ongoing in the community, including yard and street cleanups, monitoring and sampling. By bringing all parties to the table and working toward common-sense solutions, we are effectively resolving one of our state's most critical environmental and public health issues.

State and federal agencies, including the Missouri departments of Natural Resources and Health and Senior Services, will continue to monitor the health and environmental conditions in Herculaneum. It is only through continued citizen leadership and involvement and continued cooperation between the public and private sectors that we will solve this problem.

If you'd like more information, please visit our Web site at [www.dnr.state.mo.us/env/herc.htm].

Steve Mahfood

Missouri Department of Natural Resources

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Look – Up in the sky! It's on a light bulb! It's on an appliance! A replacement window! A new home! A small business! It's even on a big school or office building! It's ... it's ENERGY STAR®!

You have probably seen the ENERGY STAR label by now, emblazoned across products ranging from computers to washing machines. The U.S. Environmental Protection Agency (EPA) introduced ENERGY STAR in 1992 as a voluntary labeling program designed to identify and promote energy-efficient products as a way to reduce greenhouse gas emissions. In 1996, the U.S. Department of Energy (DOE) joined EPA in the national sponsorship and coordination of the program.

In 2002, more than 30 categories of major appliances, office equipment, lighting, consumer electronics and energy efficiency services and products carry the label. Depending on the item, electrical products that bear the label must meet energy-efficiency specifications that range from 10 to 50 percent more efficient than the minimum government specifications.

During the past six years, the ENERGY STAR program has reduced total U.S. energy needs by more than 200 billion kilowatt hours, enough to light more than 80 million homes for an entire year.

"A statistic like that may sound stunning," said Missouri Department of Natural Resources Director Steve Mahfood, "but it merely scratches the surface of what we can achieve with energy efficiency. The most readily available resource we have where we can 'find' more energy is to use what we have more efficiently. By doing this, we can reduce pollution and even eliminate the need for some new power plants."



Gentry Middle School is one of Columbia's three Energy Star labeled middle schools. *DNR photo by Scott Myers*

Star Quality Products

In the past decade, ENERGY STAR has sparked more widespread use of new technologies such as LED traffic lights, efficient compact fluorescent lighting and automatic low power and sleep modes for computers, photocopiers and other office equipment. Among the labeled products that have realized the greatest gains in efficiency are kitchen and laundry appliances (see "To Catch A Thief," Missouri Resources, Summer 2000). According to Grant Deady, spokesman for the Whirlpool corporation, ENERGY STAR labeling has fundamentally changed the landscape of the appliance marketplace.

"Ten years ago, customers were looking only for the capacity, performance and features of an appliance," said Deady. "They still look for those, but now energy efficiency is the fourth key factor..."

The purchase of an ENERGY STAR-labeled appliance requires no compromise on its features, capacity or performance, explains Deady. "The largest capacity ENERGY STAR labeled refrigerators on the market now use less energy than a 75 watt bulb. If a home appliance is over 10 years old, studies show that the energy and water savings achieved by replacing it with an ENERGY STAR labeled appliance can pay back the full costs of the replacement within just a few years," Deady said.

Starring Missouri Industries

In recent years, the ENERGY STAR label has grown to mean much more than appliance labels, extending to cover other products and services, new homes, small businesses and commercial and industrial buildings.

"It's really a platform of government and industry partnerships that offers energy-efficient solutions and information to just about every sector of the public," said Anita Randolph, director of the Missouri Department of Natural Resources' Energy Center. "The ENERGY STAR label guides us to choose products and design buildings to reduce our utility costs and benefit the environment. This offers direct economic benefit to Missourians.

Window manufacturing is one Missouri industry where increased demand for the ENERGY STAR has increased business and has even helped define the "state of the art." Target Windows and Doors Inc. is an ENERGY STAR industry partner with manufacturing and retail facilities in Vandalia and St. Louis.



Employees of Taylor Homes in Anderson install insulation – an essential component of an energy-efficient house. DNR photo by Kerry Cordray

"The ENERGY STAR program has helped the entire window industry standardize the way it measures and markets the energy efficiency of products," said Target's vice-president, Dan Dickerson. "That's been good for the industry, and good for the consumer."

Most windows built to qualify for the ENERGY STAR label use "low emissivity" glass, commonly referred to as Low-E, with a micro-thin metallic film that reduces the transfer of heat through the glass while still allowing light to pass through. The coating reflects heat toward its source, so heat from a furnace stays inside in winter and heat from the sun stays outside in summer.

Window manufacturers typically design ENERGY STAR labeled windows using Low-E glass panes separated by "dead air" insulation space which is filled with an inert gas such as argon.

"A good quality Low-E/Argon window unit is nearly twice as energy efficient as a similar conventional window with a single pane of clear glass," said Dickerson. "Four years ago when our company became an ENERGY STAR partner, about 10 percent of the windows we sold were Low-E/argon. That share has now increased to 40 percent."

The labeling of new homes represents a significant emerging market for ENERGY STAR. In 1995, the label became available for new homes that are 30 percent more energy efficient than homes built to the national model energy code. The technologies and practices that help a home qualify for an ENERGY STAR label are not necessarily new – many have long been recognized as elements of quality construction.

Key components include improved insulation, advanced windows, tightly sealed heating

and cooling ducts, high-efficiency heating and cooling systems and reduced air infiltration. In 2001, Americans bought an estimated 25,000 new homes with an ENERGY STAR label. The program now boasts more than 1,600 American builders as partners.

One of the newest of those partners is Taylor Homes, based in the small southwest Missouri town of Anderson. "About half of our customers find us while searching specifically for energy efficient design," said company president Myli Taylor. The company builds about 75 modular or "systems built" homes per year. "We became an ENERGY STAR partner in late 2001," Taylor said. By the end of 2002, we hope to build 100 percent of our homes to qualify for the ENERGY STAR label." To qualify for the label, a home must undergo an evaluation of its energy efficiency from a certified third-party home energy rater, using the nationally recognized Home Energy Rating System (HERS). An ENERGY STAR label affixed to the home's breaker box marks attainment of the standard.

Savings – Public and Private, Large and Small

ENERGY STAR also delivers technical information and diagnostic software tools to help more than 7,000 private- and public-sector partner organizations identify and implement effective energy-efficient management practices and building upgrades. These professional partnerships help businesses, manufacturers, hospitals, schools and even congregations save more than \$5 billion a year.

Those tools are paying off for Missouri's public and private ENERGY STAR partners alike. The national building energy performance rating system – first offered for office buildings in 1999 – is now available for schools, hospitals, hotels and grocery stores. Columbia Public Schools were among the first nine districts in the nation to receive the ENERGY STAR label with its three newest middle schools qualifying.

"When we build a new building, we now start at the design stage with ENERGY STAR performance levels in mind," said Alan Forbis, the district's energy manager. "The performance required to achieve the label means that the buildings are among the top 25 percent most efficient in the country, and they also meet important targets for indoor environmental quality. Utility costs per square foot for one of these new schools are lower than at some of our other district buildings that don't even have air conditioning."

ENERGY STAR software tools designed for use by building managers, like the Portfolio Manager and Benchmarking Tool, have aided Forbis and thousands of other building managers nationwide to achieve savings for facilities. Through 2000, about 2,500 office buildings were benchmarked, with 330 earning labels. Schools that make energy-efficient improvements can cut costs by an estimated 25 to 30 percent on average.

The label also is making a big difference for small businesses. Among the 2,900 ENERGY STAR For Small Business partners in the United States, nearly 100 in Missouri have registered for partnerships. This entitles them to receive free technical advice,

calculations and money-saving strategies from ENERGY STAR.

Richard Connelly's Goody-Goody Diner in St. Louis is highlighted as a success story on the ENERGY STAR Web site. The classic diner has been a fixture east of the University of Missouri-St. Louis since 1938. When it came time for some remodeling of his family's business in 1996, Connelly was looking for ways to upgrade equipment and increase profits. After an energy audit by Ameren-UE, Connelly made changes and upgrades to lighting, insulation and windows.

"Most small businesses, especially restaurants, have a low profit margin, so it's well worth finding even small ways to get energy savings. I'd tell any small business owner that energy efficiency is definitely worth the investment," said Connelly. "You especially need a good contractor who understands what you are trying to achieve. You'll see a few initial savings right away, but the ongoing savings are most important."

Since he partnered with ENERGY STAR, Connelly has continued to find ways to enhance the efficiency of his business, including recent enhancements to his heating and cooling system.

A Clear, Starry Sky

While the energy and cost saving benefits of ENERGY STAR have been impressive for Missouri consumers and businesses, the connection to the "environmental bottom line" is the original reason for the program and remains a critical measurement of its success.



At Target Windows and Doors, employees prepare sheets of glass that will be made into Energy Star rated windows. In the finished windows, each pane is made of two sheets of glass separated by a gasket. The space in between is filled with inert argon gas which acts as insulation. The resulting windows are much more efficient than older, single-pane windows. DNR photo by Scott Myers

"Energy-related production and use account for the majority of many environmental problems," observed Randolph. "Carbon dioxide from fossil fuel combustion contributes about 80 percent of total U.S. emissions. Every kilowatt hour of reduced need for energy translates into fewer emissions of air pollutants that cause respiratory illnesses, smog and acid rain, and fewer emissions of greenhouse gases that contribute to potential global climate change."

Clearly, this is a brightly rising star, well worth catching.

To find ENERGY STAR labeled products or learn more about partnerships for homes, buildings, small businesses, call 1-888-STAR YES, or visit the ENERGY STAR Web site at [www.energystar.gov].

Kerry Cordray is division information officer for the department's Outreach and Assistance Center.

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Focus on Eyeglasses: Reuse or Recycle?

Old eyeglasses may be given another chance to serve or their frames may provide revenue for the purchase of prescription lenses for the needy. Collection sites for old eyeglasses may be available through local Lions Clubs, that also collect directly from opticians, chain stores such as LensCrafters, For-Eyes and Pearle Vision Centers, as well as other charitable organizations that accept eyewear by mail.

Collected eyeglasses are cleaned, repaired and the degree of correction is measured. The available glasses are entered into a computer database and matched to people who need them. Since laws in the United States make it more difficult to dispense a prescription item, many of the recycled eyeglasses go to other countries.

While a computer search may locate additional organizations that accept donated eyeglasses by mail, one such group is New Eyes For the Needy Inc., at 549 Millburn Avenue, Short Hills, New Jersey 07078. You can call (973) 376-4903 to obtain a starter kit for an eyeglasses collection drive. The kit includes posters, labels for collection boxes, sample news releases and articles for newsletters.

New Eyes For the Needy can distribute recycled glasses directly to the poor, recycle them or sell recycled precious metals to finance the purchase of new prescription lenses for the needy. The group will accept metal frames in any condition, reusable plastic framed glasses, cataract glasses, non-prescription sunglasses and recover precious scrap metal from items such as old watches, jewelry, silverware, dentures with gold inlays and hearing



aids. Loose lenses, cases, contact lenses and eyeglasses with broken frames are not acceptable for recycling.

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Exotic Plants Threaten Missouri's State Parks

by Mike Currier



East Drywood Creek Natural Area, Prairie State Park, also is recognized as an Outstanding State Resource Water for its pristine quality and natural character. DNR file photo

If we could travel 200 years into the future and visit one of Missouri's state parks, what might we see? Would we see natural landscapes alive with colorful displays of native wildflowers and teeming with wildlife, or sterile, artificial landscapes choked with invasive exotic plants?

This scenario might seem unbelievable, but 200 years ago, could Meriwether Lewis and William Clark have envisioned a modern landscape where so little native habitat remains, where natural landscapes are so highly fragmented and tallgrass prairies and wetlands so rare? As we approach the 200th anniversary of Lewis and Clark and their "journey of discovery," invasive exotic plants are well established throughout the state and this presents a major challenge to those whose job it is to preserve natural landscapes in Missouri state parks.

"Today, our journey of discovery is to restore and preserve remnants of a historic landscape — a rich landscape that indigenous Americans and early explorers witnessed. One of the most imposing challenges that confront us is the control of invasive exotic species," said Douglas Eiken, director of the Department of Natural Resources' [Division of State Parks](#).

The department, which administers Missouri's 82 state parks and historic sites, is not alone in its concern. Invasive exotic species are becoming a concern for many private landowners who value their natural heritage. The hope is that by increasing awareness about the impacts of invasive exotic plants, there will be a growing commitment toward protecting our natural resources from these threats.

"Exotic," "introduced," "non-native" and "nonindigenous" are all synonyms for species that humans intentionally or unintentionally introduced into an area outside of a plant's natural range. The term "invasive" refers to plants that display rapid growth and reproduction, allowing them to spread over large areas. Some invasive exotic plants can be traced back to the 19th century when they were cultivated for human consumption. Others were introduced to benefit wildlife, improve soils or for erosion control. But species that seemed promising initially became invasive over time. While most exotic species cause minor effects, others like sericea lespedeza, purple loosestrife, garlic mustard, crown vetch, Russian buckthorn, autumn olive, common teasel, Japanese honeysuckle and bush honeysuckle threaten natural ecosystems and imperiled species.

Where to Find Invasive Species

To preserve natural landscapes in Missouri state parks, resource stewards and park naturalists are working to control invasive species and prevent future introductions. The following are some of the major invasive species and locations where they may be found.

Native prairies, glades, riparian areas, old fields, roadsides: sericea lespedeza, crown vetch, autumn olive, sweet clover, multiflora rose, cut-leaved teasel, Caucasian bluestem and tall fescue

Open woodlands, forests, forest edge: garlic mustard,

According to The Flora of Missouri, the reference for all plants in the state, Missouri includes 2,770 plant species. Twenty-eight percent (or 765 species) are introduced or exotic. Fortunately, only about 4 percent of these are considered invasive.

Invasive exotic plants share a number of traits in common. They exhibit rapid growth and maturity, and produce large amounts of seed. Exotic plants are adapted to a broad range of soils and have the ability to out-compete native species. The seed is widely dispersed by birds, mammals, wind or water and remains dormant and viable for many years. Many exotic plants secrete chemicals or natural herbicides that provide an advantage over other species by inhibiting their germination or growth. However, the most important advantage is they lack the natural controls that native species have — few insects and diseases affect them.

In our native grasslands, forests and wetlands, many plants and animals co-exist, each with their own role or function in the larger ecosystem. Invasive exotic plants disrupt this balance. They are recent intruders in landscapes that evolved over thousands of years. Once purposely or

bush honeysuckle, Japanese honeysuckle, sericea lespedeza, kudzu and Russian buckthorn

Wetlands: purple loosestrife and reed canary grass

inadvertently introduced to wild lands or roadsides, they often spread into natural areas. Once established, they signal the beginning of a downward spiral toward decreasing species richness and uniformity of habitats. This, in turn, affects the pattern and abundance of insects, birds, small mammals and other wildlife in that area.

With just over 138,000 acres, the state park system encompasses one-third of one percent of the total land area of Missouri. The landscapes contained within state parks support a complex interrelated mix of plants and animals. While they may appear static, they are in fact dynamic and ever changing. The mosaic of habitats created by natural disturbances like fire and floods are one reason why Missouri's natural landscapes are so varied and rich. This also makes them vulnerable to invasions of exotic species.

"Almost every state park in Missouri contains exotic species and many of them are so serious that they threaten the natural landscapes that make these areas so special," said Ken McCarty, natural resource manager for the department's Division of State Parks.

One example of such a threat is at [Prairie State Park](#) in Barton County. Of the 15 million acres of prairie that once occurred in Missouri, less than one half of one percent remains in highly fragmented remnants. Prairie State Park is one of the largest areas in the state dedicated to the preservation of native tallgrass prairie. It is home to 23 rare plants and animals, including the greater prairie chicken, northern crawfish frog, and the regal fritillary butterfly. Included within its 3,860 acres is a patchwork of high quality prairie remnants, degraded prairie, old fields and reclaimed shallow strip mines. Prescribed fires are periodically conducted to maintain the tallgrass prairie. Bison and elk have been reintroduced to add the grazing influence of large herbivores. Of the 456 species of plants that have been documented at the park, 71 (16 percent) are exotic species. Of the 10 species that are invasive, sericea lespedeza is the most serious threat.

Sericea lespedeza was introduced into the United States from Japan in 1896. It was not until the 1940s and 1950s that it was widely used for erosion control, soil improvement and wildlife cover.

"Sericea lespedeza probably occurs in every county in Missouri with heavy infestations in the southern, central and western sections of the state. It is highly invasive in native grasslands, open woodlands and native prairie plantings," according to Steve Clubine, grassland biologist for the Missouri Department of Conservation and a member of the Multi-State Sericea Lespedeza Task Force.

Control of established populations of invasive exotic plants like sericea lespedeza is not

only uncertain but also costly and time consuming. Control options include biological, mechanical and chemical methods. Prescribed burns, especially if conducted from late summer to fall, have been effective in temporarily reducing the extent of the infestation. Biological controls including introduced insects and pathogens are available for only a few species. Mechanical methods like hand pulling, cutting or mowing must be repeated many years in succession for effective control. Chemical methods include a range of herbicides that can be effective — but are expensive. In practice, integrated methods including the use of prescribed fire, mechanical and chemical methods are the best strategy.

Annual monitoring is the backbone of any effective exotic control program. The best option is to identify exotic species when populations are small and restricted in distribution when they can be confined and controlled. For established populations, the goal is to prevent seed production, while, over many years, exhausting the seed bank of viable seed. Often controlling an exotic species by reducing the density and population size to low levels is the best that can be accomplished.

At Prairie State Park, sericea lespedeza was initially observed along roadsides. Now it occurs in varying concentrations in nearly one-third of the park and has become one of the park's most serious threats. The infestation directly threatens populations of the federally threatened Mead's milkweed.

Prairie State Park is but one example of the intensive efforts to control exotic species in state parks. Garlic mustard is the target of efforts at Battle of Athens State Historic Site in northeast Missouri. At [Meramec State Park](#) near Sullivan, southwest of St. Louis, autumn olive and bush honeysuckle are the focus of control efforts. Other parks also are inundated with bush honeysuckle, as well as invasive Japanese honeysuckle, crown vetch, sweet clover or teasel.



Sericea lespedeza dominates the foreground at Prairie State Park, one of the largest tallgrass prairie preserves in Missouri. The photo shows sericea lespedeza during growing season. Missouri Department of Conservation photo by Jim Rathert

Within the state park system the problem is so large that efforts need to be targeted to protect significant natural resources first. "Exotic plants may never be eliminated from every roadside or old field, but high quality sites should be protected," said Meramec State Park Naturalist Brian Wilcox, who has been working for many years to control exotic plants at this park.

The effort to address the problem of invasive exotic species has been greatly advanced by the formation of the National Invasive Species Council to coordinate national efforts.

A Web site [www.invasivespecies.gov] has been developed to provide access to information. This year, the Missouri Senate heard a proposal to establish a state Invasive Species Council to provide similar support and coordination. The Department

of Natural Resources is working with AmeriCorps, the national service organization, to enlist crews to help with exotic species control. It also may be possible to get help from other volunteer service organizations or individuals to inventory parks for exotic species, map locations and assist with control efforts.

The "Missouri Vegetation Management Manual" draws upon the experience of public land managers and provides useful guidance to private landowners who are looking for ways to control invasive species on their own property. It can be accessed at [www.conservation.state.mo.us/nathis/exotic] or obtained by contacting the Missouri Department of Conservation.

Mike Currier is a natural resource steward with the Department of Natural Resources' Division of State Parks.

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Letters

The lingering remains of pitifully abandoned St. Louis City Hospital on the cover of the Spring 2002 issue (looks like the remains of a battle zone) is a reminder that our country clearly has not adequately dealt with its social issues. The photo reminded my wife and I of East Berlin, Germany. A few years ago we had visited the Brandenburg Gate area separating East and West Berlin. East Berlin war-torn buildings remain abandoned and a pitiful reminder that Russia lost the Cold War.

Surely, visitors to St. Louis and other Missouri communities get a bad economic welfare impression when they see abandoned locations.

Jerome Holtmeyer
Washington

I'd like to say I enjoyed your news brief article on ["Hog Producer Reaches Settlement in Pollution Suits."](#) I didn't know that any of this was going on with them. I believe it's about time someone woke up and smelled the bacon.

I raise pigs myself, but we never sold to an auction barn. I've been watching the pork price go up on pigs and have wondered, why now? This actually has answered my question. Thank you! We started talking about finding an auction barn back in November 2001, and finally found one in Alton, Missouri (two hours away from our farm). I think that it's about time little farmers make a comeback in the pork business. We started raising pigs for ourselves and surrounding family and friends five years ago since we had always heard it's better than pork from the local supermarket.

My grandpa (Bryce Corman) use to raise pigs when I was very young and quit because the hog market dropped so low. He always complained later about having to get out of the business. I can just see him smiling down

from heaven right now.

Thank you! I enjoy your magazine every time.

Julie Johnston
Pomona

Letters intended for publication should be addressed to "Letters," *Missouri Resources*, P.O. Box 176, Jefferson City, MO 65102-0176 or faxed to (573) 751-6860, attention: "Letters." Please include your name, address and daytime phone number. Space may require us to edit your letter. You also can e-mail Missouri Resource staff at moresdnr@mail.dnr.state.mo.us



Heavy Metal Matters

by Ed Knight
photographs by Scott Myers



Common mechanical thermostats contain mercury-filled "tilt" switches that if not disposed of properly become environmental pollutants.

The substance is mercury, the silvery liquid most commonly associated with thermometers. Sometimes called Quicksilver, this basic element can enter our bodies through food or air and cause neurological problems. It is the substance that caused the severe 1950s poisonings in Minamata Bay, Japan, after residents ate mercury-contaminated fish. It is the substance that led to the phrase, "mad as a hatter," due to the poisoning of hat makers caused by breathing mercury vapors. It also is the substance responsible for advisories

restricting consumption of certain sport fish in 42 of our 50 states (see graphics).

What about that mercury in your mouth? Many of us have silver fillings in our teeth, most of which are mercury amalgam. Dentists say amalgam fillings are among the cheapest, most durable and effective available. Both the Food and Drug Administration and the World Health

Organization claim mercury amalgams are safe. However, some consumer groups disagree. The debate continues.

In 2001, the Missouri Department of Health and Senior Services issued Missouri's first fish consumption advisory related to mercury. The statewide advisory states that females who may become pregnant, females who are pregnant, nursing mothers and children ages 12 and under should avoid consumption of largemouth bass larger than 12 inches in length. The greatest health concern from eating these fish is for harm to the developing nervous systems of fetuses, babies and children. The Missouri departments of Natural Resources, Conservation, and Health and Senior Services ask Missourians to heed this advisory.

The Department of Conservation has been testing fish for many contaminants, including mercury, since 1979. At first glance, the mercury data appear extensive. However, the information has been collected from thousands of miles of streams, dozens of lakes and dozens of different fish species. The small number of samples on any one stream or for any one fish species makes it difficult to identify problem areas. The Department of Health and Senior Services sifted through this database to come up with mercury advisory language that is both protective and supported by the data.

The fact that Missouri issued its first advisory in 2001 does not reflect rapid increases in the amount of mercury in fish. It does reflect recent findings of the National Academies of Science that the U.S. Food and Drug Administration mercury standard for commercial fish of 1 part per million was not protective of fetuses, babies and children. Missouri's Department of Health and Senior Services responded to this study by reducing the standard used for sport fish consumption advisories in Missouri from 1 part per million to 0.3 parts per million. Missouri's largemouth bass greater than twelve inches in length often do not meet this more protective standard.

"It's Everywhere! It's Everywhere!"

Mercury is everywhere in the environment. It has been in the atmosphere and the rain for geologic ages, though the amounts have increased significantly since the industrial revolution. Examples of natural-emission sources include volcanoes and evaporation from rocks containing mercury. The primary industrial sources are incineration and the burning of coal. Once released to the atmosphere, elemental mercury can circulate for months before coming down in rain or snow. Thus, mercury emissions can travel from state to state, country to country and continent to continent. Rainfall in the Northern Hemisphere typically contains mercury in parts-per-trillion concentrations. Eventually, mercury that falls or runs into surface waters is directed

through the food chain, resulting in concentrations in large predatory fish.

What Can We Do?

- As a nation, we can continue our dramatic reductions in mercury use. Mercury use in the United States dropped by about 80 percent since 1977. The reduced use of mercury results in less mercury mining and less global mercury emissions.

- As a nation, we can reduce mercury emissions from coal-burning power plants. The U.S. Environmental Protection Agency currently is considering a program to tighten controls on these facilities. We can expect these reductions to ultimately increase the cost of electricity.

- As a state, we can develop recycling programs for mercury and mercury-containing devices (see graphic). The Missouri Department of Natural Resources is considering the creation of a mercury recycling program.

- As a nation, we can pursue international treaties to restrict mercury mining and control mercury emissions.

- As a nation, we can do more to investigate mercury's movement in the atmosphere, the soil and the water. The department has joined the Mercury Deposition Network by placing a monitoring station to measure mercury in precipitation at the Mingo National Wildlife Refuge in Southeast Missouri. Data will be combined with that generated from other states and Canada to help state and federal governments estimate reductions that might result from tighter regulation of mercury emissions.



The Department of Natural Resources recently installed a rainfall monitoring station at Mingo National Wildlife Refuge near Puxico. The data gathered will be combined with that from other locations in the Mercury Deposition Network and will be used to monitor mercury levels in precipitation across North America.

Common Products Containing Mercury

(and how you can help reduce their environmental impact)

Product Recommended Consumer Action

Thermometers Purchase digital or mercury-free (red bulb) versions

Thermostats Purchase electronic models that do not use mercury "tilt" switches

Button Batteries Purchase mercury-free versions (zinc air type)

Quicksilver Maze Toys Purchase mercury-free toys

Mercury "Tilt" Light Switches Purchase mercury-free mechanical or electronic switches

Fluorescent Light Bulbs Purchase high-efficiency bulbs*

Jewelry With Mercury Purchase mercury-free jewelry

*While all fluorescent bulbs contain mercury, high-efficiency bulbs reduce electricity use which therefore reduces mercury emissions from power plants.

Mercury - and Fish Consumption

Missouri has seen a continuing decrease in one of the more well-known pollutants, chlordane. Levels in the state have dropped sufficiently to have consumption advisories for many fish canceled, with a few exceptions. This means those fish can be safely consumed in any amount.

Mercury is another story. Although the amounts present in largemouth bass samples tested by the departments of Health, Conservation or Natural Resources have not increased, studies now recommend lowering the acceptable levels for sensitive subpopulations. In Missouri's advisory, this means: "... women who are pregnant, nursing mothers, and children 12 years of age or younger (should) not eat any largemouth bass 12 inches in length anywhere in Missouri."

A 149 percent increase in mercury-related advisories has occurred nationwide since 1993. Forty-two states now have mercury advisories. Almost 79 percent of all fish advisories now issued are at least partially related to mercury. The total advisories exceed those issued for PCBs, chlordane, dioxins, DDT and others combined.

Source: Missouri Department of Health, U.S. Environmental Protection Agency

Illustration by Duane Ravert, United States Fish and Wildlife Service

- As individuals, we can influence policy makers to pursue the actions above.
- As individuals, we can refuse to purchase mercury-containing devices if alternatives are available.

Several states and Canadian provinces are calling for mercury recovered from recycling programs to be permanently disposed of rather than reused. There are doubts that this strategy will be effective because the mercury disposed of in the United States can easily be replaced by mercury produced elsewhere.

Although natural-occurring mercury is no greater a risk than it ever was, we "create" more opportunities for the substance to enter our water - and therefore, our bodies - in today's industrialized society.



Scott Flett and David Wibberg of Columbia try their luck at Finger Lakes State Park. The popular state park provides many fishing opportunities in strip pits left behind by a large coal mining operation that removed 1.2 million tons of coal between 1964 and 1967.

By recognizing the increased risk to certain groups, we can take steps to reduce commercial uses of mercury and industrial causes of mercury contamination. The long-term benefits of

these actions may be greater than we know.

If you are interested in reading more about mercury contamination the environment, you can visit these Web pages: [www.dnr.state.mo.us/oac/pub2100.pdf], [www.epa.gov/mercury/index.html], and [<http://minerals.usgs.gov/mercury/>].

Ed Knight is assistant to the division director for Water Protection and Soil Conservation.

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News Briefs

Conference on Clean Water



In recognition of the 30th anniversary of the federal Clean Water Act, the Missouri Department of Natural Resources is working with the governor's office and others to sponsor the Governor's Conference on Clean Water. The event is scheduled for Aug. 26-27, 2002, in Clayton.

The conference will spotlight water quality successes, challenges and opportunities, focusing especially on drinking water and wastewater issues. Gov. Bob Holden is scheduled to speak at the event. For more information, contact Candy Schilling with the department's Water Protection and Soil Conservation Division at 1-800-361-4827.

Ozone Season In St. Louis



Ozone season is here again, and in St. Louis, it is more important than ever. The St. Louis nonattainment area is very close to attaining the one-hour federal standard for ozone.

EPA rules state that to attain the standard, a nonattainment area can have no more than three exceedances over a three-year period at any monitoring site. This year in the St. Louis area, there can be no more than one exceedance at the West Alton monitoring site or two exceedances at the Wood River, Illinois, site, which both had ground-level ozone occur exceedances within the past two years.

Ground-level ozone is produced when hydrocarbons from car exhaust and other fumes mix with oxides of nitrogen from power plants and other sources. Ozone forms on warm, sunny days, and concentrations build when there is little or no wind. Ozone plays a role in causing asthma and may

cause other health problems.

Citizens can check the ozone forecast each night with the weather and reduce ozone through some simple changes such as carpooling or using mass transit, waiting until after 7 p.m. to refuel their cars and avoiding the use of charcoal lighter fluid.

Ozone season officially began April 1 and ends Oct. 31. The nonattainment area includes the city of St. Louis and St. Charles, Jefferson, St. Louis and Franklin counties in Missouri and Madison, Monroe and St. Clair counties in Illinois. For more information on ozone in the St. Louis area, contact the department at 1-800-361-4827.

Doe Run Settlement Includes Buyout

The Missouri Department of Natural Resources, the Missouri Attorney General's Office and the Doe Run Company signed the final written settlement agreement on April 26, 2002, to formalize the agreement in principle reached March 21, 2002.

The agreement settles the order issued last September by the department, which focused primarily on hazardous waste, clean water and air concentration issues, including materials handling and lead concentrate transportation.

The Department of Natural Resources, the Department of Health and Senior Services, EPA and the federal Agency for Toxic Substances and Disease Registry will continue to monitor in [Herculaneum](#). This will include air emissions, the recontamination rate and the cleanup actions. The State Implementation Plan and the Administrative Order on Consent will continue.

The centerpiece of the agreement is the Voluntary Property Purchase, whereby the Doe Run Company has agreed to offer to purchase 160 homes closest to the smelter.

Highlights of the agreement include: Homes with children under 72 months of age will receive first priority. Offers to the remaining homes will be made until December 31, 2004, and will be prioritized based on risks to human health.

The homes will remain vacant until demolished or until such time that the department, the Missouri Department of Health and Senior Services, the city of Herculaneum and the company agree that reoccupancy is not a health risk.

To ensure homeowners receive a fair offer for their property, offers will be based on fair market value of the home plus a Replacement Housing Payment. The Replacement Housing Payment will be computed by subtracting the fair market value of the subject property from the asking price of a home currently on the market in a comparable non-contaminated area. The primary area of consideration for the determination of the RHP will be the Festus/Crystal City area. Additional relocation assistance also may be available for moving expenses and closing costs.

Fair market value will be based on an independent appraisal using the Uniform Standards of Professional Appraisal Practice. Property owners may appeal by providing their own appraisal. In the event of a discrepancy, an independent certified real estate appraiser from outside Jefferson County will be selected to serve as Appeals Judge.

Doe Run will be responsible for paying a \$1 million civil penalty for any non-compliance with the provisions.

100-year Soil Survey Complete



After one hundred years of work, Missouri's 44.6 million acres of soils have been identified and mapped. "It's a great accomplishment for the natural resources of Missouri and one we can all be proud of," said Missouri's Soil and Water Conservation Commission Chairperson Elizabeth Brown.

Representatives of those who have been involved with the Missouri Cooperative Soil Survey hosted a "Last-Acre" Ceremony in Jefferson City at the Carnahan Memorial Garden on April 19.

"This is a milestone, not a beginning or the end of our efforts," said Steve Mahfood, director of the Missouri Department of Natural Resources. "This initial soil survey has laid the basis for further work to improve our knowledge about the best ways to use and conserve our soil resources, to improve our water resources by decreasing soil erosion and to conserve the land that sustains us and those who come after us."

Soil surveys include maps showing the locations and extent of soils, data about the physical and chemical properties of those soils, and information about potential uses and problems associated with different uses.

The soil survey was authorized nationally in 1886. Work officially began in Missouri in 1899. Missouri's efforts have been continuous, though the last

25 years have seen an intense push to complete the inventory.

Soil scientists in Missouri, on both a state and federal level, worked together on fieldwork covering all of Missouri's land area, identifying 5,000 soil types. Laboratory analysis was conducted at the Soil Characterization Laboratory at the University of Missouri-Columbia. The survey covers every Missouri county.

"This huge undertaking could not have been successful without the working partnership between the Natural Resources Conservation Service, the Missouri Soil and Water Conservation Commission, the Missouri Department of Natural Resources, and the University of Missouri-Columbia," said Gov. Bob Holden. "Farmers, agricultural professionals, community planners, engineers, homeowners and developers can use this information to plan, work and build more effectively with the capability of our soil resources in mind."

For information on your county's soil survey call the Natural Resources Conservation Service at (573) 876-0907 or the Department of Natural Resources at (573) 751-4932. For news releases on the Web, visit [\[http://www.dnr.mo.gov/newsrel\]](http://www.dnr.mo.gov/newsrel).

Passport Program Explores State's Geologic Wonders



Caves, natural bridges and sinkholes are just some of the interesting geologic wonders that can be found in Missouri, and the Department of Natural Resources has the passport for exploring them. The theme for this year's Missouri State Park Passport Program is geologic wonders and it showcases state parks where visitors can find and enjoy these unique occurrences.

This is the third year of a special five-year passport program that encourages people to visit state parks and historic sites they may not have visited before. A special theme is featured every year and this year's encourages people to explore geologic wonders. When people visit the 10 state parks featured and get their passport stamped, they will earn a commemorative patch. Souvenir stickers for each of this year's featured parks also are available for purchase.

To successfully complete the passport program, participants will visit the following geologic features: caves at [Graham Cave](#), [Meramec](#), [Onondaga Cave](#) and [Lake of the Ozarks](#) state parks; giant granite boulders at [Elephant Rocks State Park](#); a large canyon and natural bridge at [Grand Gulf State Park](#); a variety of rock types at [Hawn State Park](#); a natural

water park at [Johnson's Shut-Ins State Park](#); a natural bridge and sinkholes at [Rock Bridge Memorial State Park](#); and the highest point in Missouri and our highest wet-season waterfall at [Taum Sauk Mountain State Park](#).

Passports, which contain information and photographs about all of Missouri's 82 state parks and historic sites, can be purchased at select state parks and historic sites or by calling toll free 1-800-334-6946 (voice) or 1-800-379-2419 (Telecommunications Device for the Deaf).

10 Million Tires Removed Since '96



The Missouri Department of Natural Resources has removed nearly 10 million waste tires from the state's environment since clean-up efforts shifted into high gear in 1996.

Since the effort began, 335 illegal tire sites have been cleaned up. The cleanups to date have cost about \$7.1 million. As a result of department enforcement, tire pile owners cleaned up 241 sites at their own expense, removing more than two million tires since 1996.

The waste tire funds come from the 50 cents per tire that buyers of new tires pay at the time of sale. The fee is scheduled to expire on Jan. 1, 2004.

The department has been working with a Waste Tire Advisory Council to discuss an extension of the tire fee and the future role of the department's waste tire management efforts.

Missouri generates around 4.5 million waste tires annually. These waste tires, in addition to the 2.6 million tires picked up at illegal dumpsites over the past year, are used for electricity generation, beneficial use at landfills or processed into crumb rubber. The crumb rubber is used in new tire manufacture and for processing into surface material for playgrounds, walking trails and running tracks.

Around \$100,000 from the department's Waste Tire Fund is made available annually to nonprofit agencies or groups for use in surfacing playgrounds, walking trails or running tracks. Since the program started in 1993, the department has provided 251 waste tire grants.

For more information, call the Department of Natural Resources' [Solid Waste Management Program](#) at 1-800-361-4827 or (573) 751-5401.

Program Enhances Camper Safety



Campers at Missouri state parks and historic sites should feel even safer this summer because of a new Campground Watch Program. The watch program, similar to the neighborhood watch program, was begun to ensure that visitors have a safe and enjoyable camping experience.

"Although state parks and historic sites provide a safe place for visitors to enjoy themselves, we are always looking for ways to reduce any chance that they may experience problems such as theft of property," said Douglas Eiken, director of the department's Division of State Parks.

State park rangers will work with park staff and volunteers such as campground hosts to increase the amount of contact with campers. A list of simple precautions will be provided to campers to help ensure that their campsites and those around them are safe. These tips range from securing all camping gear if you are away from your campsite for long periods to noting in advance where the pay phones and campground hosts can be found. These tips will be handed out in the campgrounds and also are available on the division's Web page at [<http://www.mostateparks.com/rangers/campwatch.htm>].

This summer, 31 campgrounds are participating in the Campground Watch Program. Participating parks will display the colorful campground watch sign in the campgrounds. If the program is successful, it will be expanded to more campgrounds next year.

Environmental Educators Meet



The 7th Annual Environmental Education Conference will be held November 22-24 at Tan-Tar-A resort in Osage Beach. This conference typically draws about 350 formal and non-formal educators from across Missouri to explore current issues and trends in environmental education and to share new ideas for teaching about the environment. Attendees also are encouraged to consider joining the Missouri

Environmental Education Association, one of the co-sponsors of the conference. For additional information, visit their Web address at [<http://www.meea.org>].

The theme for this year's conference, "Stepping Stones: Linking Education & the Environment," will showcase the various ways informal and formal environment-based education can help to improve academic performance across the curriculum. The conference format includes a rich array of professional development opportunities ranging from concurrent sessions, field trips, keynote speakers and more. Following last year's success, an expanded "Taste of Missouri" banquet and coffeehouse will again be part of the mix.

The deadline for presentation proposals was June 7th, but if you have a great idea for part of the conference, it may not be too late to get on board. Registration materials will be available in late July. For more information, contact Jim Lubbers, an environmental education specialist with the Missouri Department of Natural Resources, at 800-361-4827 or 573-751-3443, or by e-mail at nrlubbj@mail.dnr.state.mo.us.

You also may visit [<http://www.successlink.org>] for details and registration information.

Recycling Groups Meet in St. Louis

The Missouri Recycling Association (MORA) and the Illinois Recycling Association will sponsor the first Midwest Gateway Recycling Conference on July 15-17 at the Hyatt Regency Hotel in downtown St. Louis. "We expect more than 400 attendees and possibly 40 exhibitors," said Kristin Allen, MORA president and manager of the Missouri Market Development Program, which is administered under the [Environmental Improvement and Energy Resources Authority \(EIERA\)](#). "This is the first time MORA and the Illinois group have sponsored a joint conference." The Illinois recycling organization has about 200 members.

The EIERA board of directors recently approved a Silver Sponsorship to support the two-day conference.

MORA is a 200-member statewide organization that supports waste reduction and recycling by providing information, educational opportunities, and technical assistance. The group publishes a quarterly newsletter and is an affiliate member of the National Recycling Coalition.

Grants Reward Recycling Firms

The [Missouri Market Development Program](#), which is administered under the Environmental Improvement and Energy Resources Authority (EI ERA), recently provided financial assistance totaling \$82,500 for two Missouri companies.

Bryant Plastics, Gainsville, received \$32,500 to purchase a large grinder. The grinder will allow recovery and recycling of large pieces of plastic previously trucked to area landfills. Bryant Plastics produces PVC pipe for sewers, drains, and irrigation systems and makes plastic fencing.

PK Insulation is a Joplin-based company that manufactures insulation from newsprint and office paper for residential and commercial purposes. PK Insulation received \$50,000 in assistance to develop a second assembly line to meet increased demand for their products.

EPA Looking For Nominations

The U.S. Environmental Protection Agency (EPA), Region 7, is seeking applications for Pollution Prevention Awards For Environmental Excellence from businesses in Iowa, Kansas, Missouri and Nebraska.

The awards honor businesses for environmental excellence in eliminating or reducing waste at the source.

The goals are to eliminate or reduce waste generation, to conserve natural resources and materials, to reduce the use of hazardous materials, and to promote the use of more energy-efficient equipment.

The deadline to submit applications is July 15, 2002. Winners will be announced this fall. Applications are available from Jennifer Anderson of EPA at (913) 551-7644, by fax at (913) 551-7521 or on the Web at [<http://www.epa.gov/region07/specinit/p2/awards.htm>].

Spring River Gets Cleanup Help

Several state and federal agencies are coordinating efforts to reduce environmental impacts from the former Valley Sanitation Service Inc. sanitary landfill near Lamar.

Leachate and sediment from the old landfill, that operated from 1975 to 1980, has impacted the water quality of the North Fork Spring River. The

old landfill was never properly closed, therefore, vegetation cover is sparse on about 40 percent of the site. This has resulted in water ponding on the surface and seepage into the landfill. As a result, leachate and sediment has gradually discharged into a stream that feeds into the North Fork Spring River.

To correct this, the department is working with the family of the late owner of the landfill site to remediate 14.5 acres of the 30-acre site.

The three-year project will use money from a federal grant. Other assistance will be provided by the University of Missouri-Rolla, the Department of Conservation, the Barton County Soil and Water Conservation District and the Natural Resources Conservation Service.

The Spring River Basin and the North Fork Spring River are listed as a priority for restoration. Improperly closed or abandoned landfills are listed as significant nonpoint sources of water pollution under Missouri's Nonpoint Source Pollution Plan.

The department is considering the introduction of legislation that would create a solid waste remedial fund that could be used to close and maintain environmental oversight on old landfills that still exist in Missouri.

For more information on the project, contact Craig Abbott at 1-800-361-4827 or (573) 751-5401.

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One Last Word

Centennial Tree Has Earth Day Roots

by Van Beydler
photograph by Scott Myers



Betty Fast, of Immaculate Conception School in Jefferson City, helps her second-grade students select white pine seedlings. Fast was assisted at Earth Day 2002 by Missouri Department of Transportation staff.

Improving the environment is an important job every day of the year. To highlight the importance of preserving our environment, the Missouri Department of Natural Resources partners with other state and federal agencies to hold an annual Earth Day celebration.

This year, to keep the spirit of Earth Day alive throughout the year and to recognize the 100th Missouri State Fair, the Missouri departments of Agriculture, Natural Resources, and Transportation (MoDOT) joined together to plant an official Missouri State Fair

Centennial Tree at the fairgrounds in Sedalia.

The Missouri State Fair Centennial Tree is a Concordia Oak. Earlier in the year, Marvin Petersen of Concordia donated a specimen to the MoDOT Highway Gardens. A special marker will be placed near the fair's official Centennial Tree describing its history and significance.

"The tree is unique because, to my knowledge, it doesn't exist anywhere else in the world," said Paul Thomson, a botanist who discovered the species in 1974 at the Concordia rest area off Interstate 70, approximately 50 miles west of Kansas City. "It was aptly named the Concordia Oak because of where it was discovered."

According to Thomson, the tree is a previously unknown natural hybrid of chinkapin oak and swamp white oak. Because of its uniqueness, he has supplied botanists from around the world with copies of the scientific documentation of the hybrid.

Elementary-grade classes attending Earth Day activities at the Capitol this past April took part in recognizing the Centennial Tree by planting tree seedlings in their communities. MoDOT gave away more than 5,000 free white pine tree seedlings at Earth Day. Fifth-grade classes were invited to participate in a photo contest showing their seedlings being planted. Out of all submitted photos, one randomly selected class will win an aquarium donated by Pets Plus in Jefferson City. All of the photos will be displayed in the MoDOT Highway Gardens at the state fair in August as part of the Centennial Tree dedication. The photos can be seen on the Earth Day Web page at [www.dnr.state.mo.us/earthday/].

The Missouri Department of Natural Resources will have exhibits inside the Woman's Building from Aug. 8 through 18, during the 100th Missouri State Fair. Stop by to find out about state parks, historic preservation and environmental issues. Plus, enjoy a visit to the natural beauty of the MoDOT Highway Gardens and see the Missouri State Fair Centennial Tree.

More information about the Concordia Oak is available in the publication, Illustrated Flora of Illinois, Vol. 11, written by Robert H. Mohlenbrock and Paul Thomson.

For more information about the events and schedule of the 2002 Missouri State Fair, visit [www.mostatefair.com].

Van Beydler is a division information officer for the department's Air and Land Protection Division.

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Resource Honor Roll



Betty Broemmelsiek

Betty Broemmelsiek – Efforts Remembered

Nobody has done more for soil and water conservation than Betty Broemmelsiek," said Don Wolf, former director of the Department of Natural Resources' Soil and Water Conservation Program. Not a man of verbosity, the quote speaks volumes.

Betty Broemmelsiek, of Defiance, was elected to the St. Charles County Soil and Water Conservation District board in 1967, becoming one of the first women district supervisors in the United States, and served in that capacity for 21 years. She unselfishly offered Chabanel, the family cattle farm, for workshops, tours and other educational activities.

Broemmelsiek was appointed to the state Soil and Water Districts Commission in 1974 and helped secure a constitutional amendment for a dedicated parks and soils conservation sales tax on the ballot. In 1988, she again led the effort by co-chairing a citizens committee for the petition drive. She also taught the "Springboard to Learning" program in St. Louis that introduced inner-city youths to food production and other agricultural and conservation issues. The program always ended with an enlightening, hands-on tour of Chabanel.

Missouri's one-tenth-of-one-percent parks and soils sales tax has enabled landowners to meet requirements of the 1985 and 1990 Farm Bills. Her death, in December 1999, left a void in the lives of those who knew her. Broemmelsiek's devotion to soil conservation efforts has helped make the Missouri's program one of the best.

Broemmelsiek was the first woman to serve on the National Conservation Districts Board of Directors from 1982-1987. She also chaired the National Soil and Water Conservation District's Education Committee. She received its Special Service Award in 1991 and was a member of the Soil and Water Conservation Society's Missouri

Show-Me Chapter from 1976-1995. A \$600 million state bond issue approved in 1982 generated approximately \$24 million, \$16 million of which went to the Soil and Water Commission at the same time the first of the sales tax was being collected. This money was the first available cost-share funding for the program after its initial EPA grant.

In 2001, the Show-Me Chapter created the Betty Broemmelsiek Memorial Scholarship in soil and water conservation and related natural resources. The scholarship honors her commitment to youth education and her tireless support and promotion of Missouri's parks and soils sales tax.

As a chairperson, supervisor, board member and mentor, Broemmelsiek still never forgot the impact and value that our youth bring to complex issues if the topics are interesting and understandable. Mary Burt, manager of the St. Charles County Soil and Water Conservation District remembered one such example. "(One) time she was taking a group of kids through her cow pasture and as they were leaving, she told them not to take that brown stuff on the bottom of their shoes home with them because that was her fertilizer."

Thanks in part to Betty Broemmelsiek, Missouri's soil and water conservation efforts are still getting off on the right foot.



Lori, Kristen and Scott Hargis

Lori Ann Hargis – Tasks by the Ton

Lori Ann Hargis of O'Fallon was one of three winners from the Individual category of the 2001 Environmental Excellence Awards for the Gateway Region of Choose Environmental Excellence. Annual awards also are given out in Education, Business and Industry, Government, Environmental and Organization categories. Forty-five people were nominated for the category. Hargis was nominated by her husband, Scott.

Hargis initiated recycling for a wide range of materials at her workplace in 1996 and has maintained it since. She encouraged her fellow employees to participate by paying for the initial recycling bins herself. Before long, Hargis had the solid backing of management at

In Print USA, and the enthusiastic support of her co-workers as well. Recycling can be a daunting task in the printing industry, but with her company behind her, the rest fell right into place. What workers don't use for their own church or school projects is sent to local recyclers, often transported by Hargis herself after some sorting and resorting at home. The Hargis's estimate that they have kept 10 or more tons of material from St. Louis-area landfills over the past five-plus years.

Co-worker Jason Crawford thought Hargis was just a zealous recycling enthusiast

helping to support In Print's recycling program. Once he realized that she got the whole thing started, he noted the impact it has had. "Other employees now think to recycle items instead of just throwing them away, and the company, as a whole, has become more environmentally conscious because of Lori's actions," said Crawford.

Hargis co-created Missouri Stream Team No. 1004 "Massas Creek Preservation" in Jonesburg and assists with water-quality monitoring and clean-ups there. She and Scott attended water quality monitoring training together to ensure that their efforts were based in science. She and her family adopted Lake No. 7 at the Busch Conservation Area and during the every-other-month clean-ups, uses the opportunity to teach her young volunteers how to sort recyclables from trash.

Stepdaughter Kristen assists as do some of her neighborhood girlfriends. Hargis lives in tune with one of Choose Environmental Excellence's cornerstone beliefs - simple steps can make a difference. "Preserving the place where we live should logically be our first priority," says Hargis. "The solution ... (is) as simple as changing our way of thinking and habits toward more environmentally sound practices."

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Resources to Explore



Editor's Note: This is part two of a four-part series recognizing the 25th anniversary of the Missouri Natural Areas Program. Part three will be published in the fall issue of Missouri Resources. The Missouri Natural Areas Program is a cooperative effort by state and federal agencies, conservation organizations, local governments, corporations and private citizens to protect some of the state's best examples of natural communities. The program is jointly administered by the Missouri Department of Natural Resources and the Missouri Department of Conservation with representation by the U.S. Forest Service and the National Park Service.

A tall, thick and rank growth of wild grass covers the whole country ... in which the oaks are standing, interspersed like fruit trees in some well cultivated orchard." This was how Henry Rowe Schoolcraft described those areas of the Ozarks explored in the winter of 1818.

In Schoolcraft's time, bison and elk were still part of this open woodland landscape where trees, grasses and wildflowers were blended together in nearly equal dominance. Had he the good fortune to behold this landscape at the pinnacle of its spring wildflower bloom, his senses would have been engulfed by color and fragrance.

Today, one of the few places he would find a tall and dense growth of native grass beneath an orchard of oaks would be the new 831-acre Meramec Mosaic Natural Area at [Meramec State Park](#) near Sullivan.

Natural area designation is more than an arbitrary title. The multi-agency Missouri Natural Areas Committee votes to give public and private lands in Missouri official recognition for having exceptional natural integrity. Consequently, the quality of the natural resources that justifies designation as a natural area is expected to be protected for perpetuity. Some of the criteria the designation committee looks for are high biodiversity, rare plants and animals, functional natural communities and superlative geologic features.

The Meramec Mosaic Natural Area scored high in all these areas. The fire-dependent natural communities were recognized as especially noteworthy. These open woodlands and glades were common in Schoolcraft's time but rare today.

An 1822 land survey noted a highly varied landscape shaped by the influence of fire. Less than two miles west of the Meramec Mosaic Natural Area, there was a 400-acre prairie in 1822. Some of the land inside today's natural area was described as having thin, rocky soil covered with grass and wide-open timber.

The dominant tree of the Meramec Mosaic Natural Area open woodlands is the chinkapin oak. These ancient gnarled and craggy oaks reign in rugged elegance over a diversity of native grasses and wildflowers.

In the center of these open woodlands are 15 sun-drenched glades. Protruding from the glade's carpet of grasses and wildflowers are numerous dolomite bedrock outcrops. In

spring, these outcrops are especially popular with sunbathing reptiles such as the colorful six-lined racerunner lizard.

These glades are also home to a stable population of brown tarantulas. This is the same species of docile tarantula that inhabits the American southwest. They reach the northeast limit of their natural range in nearby St. Louis County. Unfortunately, tarantula populations further northeast appear to be in serious decline.

Typically, open woodlands and glades produce an impressive wildflower display in April, May and June. If adequate moisture is available they may bloom throughout the growing season.



Sierra Club volunteers help burn eastern red cedars that were shading out the glades.
DNR photo by Susan Farrington

In late April, the color and fragrance of rose verbena attract the first big emergence of butterflies. In early May, the bright red blooms of Indian paintbrush welcome back shimmering swarms of ruby-throated hummingbirds. Another burst of butterflies coincides with the profusion of large glade coneflowers that bloom in early June.

Many of the glades also offer inspiring vistas of the Meramec River valley and forest-covered hills. The glade on top of Butterfly Bluff, a cliff along the Meramec River, offers a commanding view of the river. In winter, it is especially serene — a place of quiet solitude where the beauty of nature can permeate the soul. In early March, this vista is a superb place to see and hear the screaming, acrobatic courtship dives of a pair of red-shouldered hawks.

Historically, open woodlands and glades were kept open by lightning fires and fires started by Native Americans. Sometimes, these fires burned for weeks and destroyed hundreds of square miles.

In modern Missouri, wildfires seldom burn even a single square mile. According to Missouri Department of Conservation records, there were 172 wildfires caused by lightning between 1992 and 2000. However, because of roads, plowed fields and the fast response of firefighters, only 2,153 acres were burned.

In order to perpetuate the abundant variety of plants and animals that depend on fires to provide their habitat needs, Meramec State Park personnel periodically use prescribed fires.

Fire was suppressed on the land in today's natural area from the mid-1930s until the late 1980s. That allowed large numbers of eastern red cedar tree seedlings from surrounding river bluffs to invade the open woodlands and glades.

The cedars were well on their way to shading out the native grasses and wildflowers when glade restoration volunteers, predominantly from the Sierra Club's Eastern Missouri Group led by Penny Holtzmann, came to the rescue in 1989. Park staff cut down and cut up the cedars. Then teams of Sierrans, park patrons, Boy Scouts and Girl Scouts burned them.

Twelve years of cedar removal, nine years of prescribed burns and more than 16,000 hours of paid and volunteer labor have returned this natural community to its historic place in the sun and flame. This has made the Meramec Mosaic Natural Area's restored chinkapin oak woodland the largest in the Missouri natural areas system.

Another record holder in the Meramec Mosaic is Beaver Creek. This perennial creek is fed by four springs and flows for one and one-half miles through the natural area before joining the Meramec River. The 22 documented species of native fish there is a state record for a headwater stream.

A half-mile section of the Meramec River also is included in the natural area. This area is home to rare aquatic species such as the Alabama shad, Ozark clubtail dragonfly, Arkansas snaketail dragonfly and the spectaclecase mussel.

This section of the Meramec River is also likely habitat to additional rare aquatic species such as the highfin carpsucker, mooneye and the Eastern hellbender. These aquatic species have been recorded in comparable habitat within one-half mile of the Meramec Mosaic. The potential for additional rare aquatic species is enormous in the river portion of the natural area. Of the 573 described native fish species in North America, 120 inhabit the Meramec River.

The mature bottomland forest that borders this section of the river is breeding habitat for the rare cerulean warbler. However, the rarest animals documented from the natural area are some of its bats. Indiana bats and gray bats, both federally listed endangered species, seasonally inhabit two of the six caves in the Meramec Mosaic Natural Area.



Prior to the 1900s, the native eastern red cedar trees were confined by fires to cliffs like Butterfly Bluff. DNR photo by Scott Myers

Currently, the only maintained access into the Meramec Mosaic Natural Area is the 1.3-mile Natural Wonders Loop Trail. A glade, two caves, beaver meadows and mature north-facing forest highlight the natural area gems you will discover on this trail. The elusive ovenbird and wood thrush are common along much of the trail during their breeding season. In mid-May, the trail also is an excellent place to see the showy blooms of the large, yellow lady-slipper orchid.

We cannot return the modern Missouri landscape to the condition that 1820s land surveyors found it in, nor can we believe that it would have remained an unchanging landscape. Paleontological records show great changes in Missouri's natural communities in just the last few thousand years.

However, through natural area designation and management, Missourians are striving to preserve our present biodiversity. Not all these species will survive 200 years from now. However, places like the Meramec Mosaic Natural Area will give our present native species a fighting chance.

To see the largest and best open woodlands and glades in the Meramec Mosaic Natural Area, get directions to Butterfly Bluff. Call (573)-468-8155 and ask for Meramec State Park naturalists Brian Wilcox or Jody Miles. Park patrons also are invited to attend one of the glade restoration outings in February or March of 2003.

For more information on natural areas in Missouri state parks or a copy of our free Natural Areas Directory, call the Missouri Department of Natural Resources toll free at 1-800-334-6946 (voice) or 1-800-379-2419 (TDD).

Dan Drees is a natural resource steward with the Missouri Department of Natural Resources' Division of State Parks.



Teacher's Notebook

LIVING IN THE PAST

by Jennifer Sieg
photographs by Scott Myers



With a cape draped over her shoulders and her hands tucked into a muffler, Jennifer Elam, sporting 1870s attire, leads a group of college students down a snowy gravel pathway to Watkins Woolen Mill. These students are studying industry in a history class at William Jewell College and today, Elam is their teacher. Although not a teacher by profession, she has been assigned to teach them various processes associated with a woolen mill and the importance of this industry during the 19th century - a subject in which she is well prepared and rehearsed.

Elam is an interpretive resource technician with the Missouri Department of Natural Resources' Division of State Parks at [Watkins Woolen Mill State Park](#) and State Historic Site in Lawson. A major part of her job is interpreting the history of the mill and the entire Watkins 19th century farm for school groups, senior citizens, college students, day care centers and the general public. When giving tours, Elam says that flexibility is a must. The way you explain things has to be based on the age and education level of your group. "Sometimes you'll have a variety of people in a group and this creates a challenge. You have to have the ability to make quick decisions as you feel the group out," she says.

The fact that the site raises farm animals and interprets a variety of businesses that

were a part of the Watkins estate creates a variety of job duties for Elam. "I do everything from office work to cleaning chicken pens," claims Elam. When not giving tours, Elam is responsible for setting up group tours, working at the reception desk, helping visitors plan trips to the park, coordinating special events at the site, and cleaning the mill and the house. She also does research about the site and era they are interpreting, and electronically catalogues the site's artifact collection. In her spare time, she does some weaving and makes Christmas decorations, tea towels and carpets for the Watkins home using old costumes. "My career here at Watkins Mill is archived in the carpets in the house. Each one contains fabrics from different dresses that I've worn over the years," Elam said.

Elam worked at the site as a seasonal employee for six years before getting a full-time job as a historic site interpreter in 1998. Her experience at the site, interest in history, outgoing personality and ability to work with the public were key attributes in landing the job.

Each spring, her ability to work with the public is put to the test as the site is swarmed with school children excited to be out of the classroom. To keep their interest while teaching them about the site, she has set up a hands-on table where the children learn to weave.

Elam also gets the opportunity to step into a classroom on occasion and play the role of a teacher. As part of the historic site's Franklin Academy Program, school children come to the site dressed in period clothing and attend a two-hour class inside the site's one-room schoolhouse. The students write on slates, have spelling bees and learn other firsthand information on how a one-room school operated.

During the summer months, the site features a Living History Farm program. Elam and her coworkers, along with some seasonal employees whom Elam helps train, dress in period clothing and recreate the lifestyle of people in 1870s rural America. They show how the people were self-sufficient by butchering chickens, cooking meals and planting a huge heirloom garden filled with period vegetables. Elam is responsible for the Foodways Program, which involves cooking meals in the home's summer kitchen every weekend using only equipment that was available during that time.



Jessica Mikulich gets some hands-on weaving experience at an exhibit inside the visitor center at Watkins Woolen Mill State Park and State Historic Site.

When visitors have a question about their unusual job duties, Elam responds by saying, "We live this life from nine to five, then go home, throw on some shorts, microwave a frozen dinner and watch television just like everyone else."

Overall, Elam finds her job to be very rewarding. She feels it's important to preserve our history and remind



A group of students from William Jewell College listens intently as Jennifer Elam explains how the woolen mill operated.

Missourians and others "who we were," and finds that most people appreciate what she does. "Being an interpretive resource technician is not something that I planned as a child, but after one summer as a seasonal employee, I fell in love with it and stuck with it," says Elam. "I enjoy my job. It offers a variety of indoor and outdoor activities and is interesting. It's a perfect fit for me."

Watkins Woolen Mill State Park and State Historic Site is one of 23 historic sites in the state park system that employ interpretive resource technicians. Each site has its unique story to tell, providing variety within the field of historic site interpretation. To qualify as an interpretive resource technician, applicants must have two years of experience in interpretation work or comparable experience in a

conservation or environmental program, or education in an accredited college or university in related field. For more information about the department's opportunities in this field, call the department's Outreach and Assistance Center at 1-800-361-4827 and ask for the Human Resources Program.

Jennifer Sieg is a public information coordinator for the department's Division of State Parks.

MISSOURI resources

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On September 18, 1864, federal troops and pro-Southern state guard troops battled for control of pro-Southern Lexington. The three-day battle ended with federal troops surrendering to Commander of the State

Guard Gen.

Sterling Price. In response to the state guard's victory, the Union rallied a massive force and drove Price out of the Missouri Valley and back to the southwest corner of Missouri.

In May 1961, between 20,000 and 25,000 spectators gathered to watch a reenactment of that 1864 Civil War battle. The photo at right shows students of Wentworth Military Academy reenacting the battle for the Oliver Anderson House. During the course of the battle, the house - which was considered one of the finest west of St. Louis - changed hands three times. The 1853 mansion is now open to the public as part of the [Battle of Lexington State Historic Site](#). *DNR archive photo*

Send your photo to "Time Exposures," c/o *Missouri Resources*, P.O. Box 176, Jefferson City, MO 65102-0176. All pictures will be returned via insured mail. Pre-1970 environmental and natural resource photos from Missouri will be considered. Please try to include the time and location of the picture, a brief description and any related historic details that might be of interest to our readers.